

WHAT IS CLAIMED IS:

1. An optical communication apparatus in which at least one of a semiconductor laser serving as an input light source and an electronic device for controlling optical modulator, and an optical modulator for intensity modulation of the output light from the semiconductor laser are monolithically formed on a single GaAs semiconductor substrate, and a signal light in the optical device has a wavelength in a range not smaller than 1.15 micrometers and not greater than 1.62 micrometers.

2. An optical communication apparatus as claimed in Claim 1, wherein the optical modulator is of light interference type having a progressive wave type electrode.

3. An optical communication apparatus as claimed in Claim 1, wherein an active layer material of the semiconductor laser contains gallium and arsenic and one selected from a group consisting of indium, aluminum, nitrogen, and antimony.

4. An optical communication apparatus as claimed in Claim 1, wherein the active layer of the semiconductor laser has at least one of the quantum well structure, quantum line structure, or quantum dot structure.

5. An optical communication apparatus as claimed in Claim 1, wherein a signal light in the optical device has a wavelength value capable of optical signal

transmitting by an optical fiber using a glass material.

6. An optical communication apparatus comprising an optical device and an electronic device for controlling the optical device which are arranged on a single GaAs semiconductor substrate and which are electrically connected by a wiring provided on the substrate,

wherein the optical device has an active layer including at least one selected from a group consisting of a GaInNAs quantum well, a GaInNAsSb quantum well, a GaAsSb quantum well and an InGaAs quantum dot; and the electronic device has an active layer formed from at least one of the following combinations: InGaAs/InAlAs, InGaAlAs/InAlAs, or InGaAs/InP.

7. An optical communication apparatus as claimed in Claim 6, wherein the electronic device comprising a thin film crystal layered on the semiconductor substrate through a semiconductor buffer layer, the thin film crystal having a different crystal constant perpendicular to the substrate crystal face from the substrate more than 1.0%, and having a lattice non-match system crystal structure.

8. An optical communication apparatus as claimed in Claim 7, wherein the buffer layer contains at least one selected from a group consisting of GaAs, AlGaAs, and InAlAs.

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9. An optical communication apparatus as claimed in Claim 6, wherein the active layer of the semiconductor laser contains gallium and arsenic and one selected from a group consisting of indium, aluminum, nitrogen, and antimony.

10. An optical communication apparatus as claimed in Claim 6, wherein the active layer of the semiconductor laser has at least one selected from a group consisting of the quantum well structure, quantum line structure and quantum dot structure.

11. An optical communication apparatus as claimed in Claim 6, wherein a signal light in the optical device has a wavelength value capable of optical signal transmitting by an optical fiber using a glass material.

12. An optical communication apparatus production method comprising steps of:

successively forming a buffer layer and an active layer of an optical device on a GaAs semiconductor substrate;

removing a part of the buffer layer and the active layer; and

successively forming a buffer layer and an active layer of an electronic device in that removed portion;

wherein contains at least one selected from a group consisting of a GaInNAS quantu well, a GaInNASb quantum well, a GaAsSb quantum well, and an

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InGaAs quantum dot; and the active layer of the electronic device is formed from at least one of the following combinations: InGaAs/InAlAs, InGaAlAs/InAlAs, or InGaAs/InP.

13. An optical communication apparatus as claimed in Claim 12, wherein the electronic device comprising a thin film crystal layered on the semiconductor substrate through a semiconductor buffer layer, the thin film crystal having a different crystal constant perpendicular to the substrate crystal face from the substrate more than 1.0%, and having a lattice non-match system crystal structure.

14. An optical communication apparatus production method as claimed in Claim 13, wherein the buffer layer contains at least one selected from a group consisting of GaAs, AlGaAs, and InAlAs.

15. An optical communication apparatus production method as claimed in Claim 12, wherein the active layer of the semiconductor laser contains gallium and arsenic and one selected from a group consisting of indium, aluminum, nitrogen, and antimony.

16. An optical communication apparatus production method as claimed in Claim 6, wherein the active layer of the semiconductor laser has at least one selected from a group consisting of the quantum well structure, quantum line structure and quantum dot structure.

17. An optical communication apparatus production method as claimed in Claim 12, wherein a signal light

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in the optical device has a wavelength value capable of optical signal transmitting by an optical fiber using a glass material.

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